(2) Improper - methods of Rational - functions :-

→ $I \Rightarrow \int_{-\infty}^{+\infty} f(x)\,dx = \lim_{x \to \infty} \int_{-x}^{x} f(x)\,dx$

$P(A) = 0.60$ %

$P(B) = 0.5$

~~$P(A \cap B) = 0.3$~~ $1 - P(A \cup B) = 0.3$

① ~~$P(A \cup B) = P(A) + P(B) - P(A \cap B)$~~

$\Rightarrow 0.6 + 0.5 - 0.7$

$= 0.4$.

(1)

~~② $P(A \cap B) = 0.7$~~

$P(A \cup B) = 0.7$

② $P(A \cap B) \Rightarrow 0.6 + 0.5 - 0.7$

$= 0.4$.

③ $P(A \cap B') \Rightarrow P(A) - P(A \cap B)$

$\Rightarrow 0.6 - 0.4 = 0.2$.

④ $P(A \cup B) - P(A \cap B) = 0.3$.

(2) ① $2/3$

② $\frac{2}{6} \times \frac{4}{5} + \frac{4}{6} \times \frac{3}{5}$

$\Rightarrow \frac{4}{15} + \frac{2}{5} = \frac{2}{3}$.

(2) $\frac{4/6^2 \times 3/5}{2/3} \rightarrow \frac{3}{5}$.

(3) $x \quad y \quad z$

$x+y \geq 1-x-y$

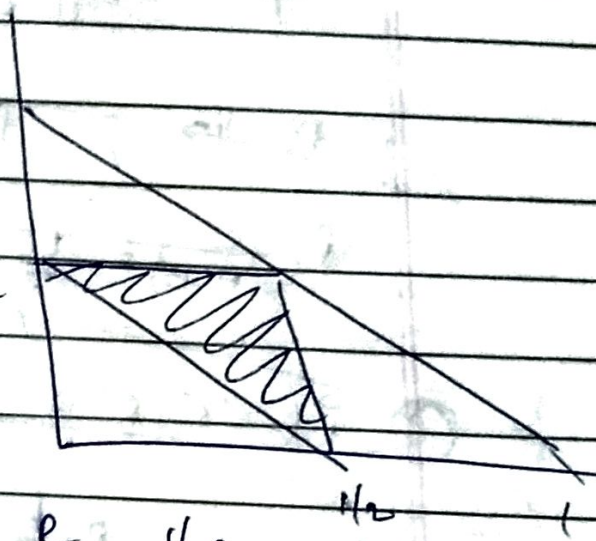
$x+y \geq 1/2$

$x+1-x-y \geq y$

$y \leq 1/2$

$y+1-x-y \geq x$

$x \leq 1/2$



$P = 1/4$.

(4)

(5) $P_1 + (1-P_1)(1-P_2)P_1 + (1-P_1)^2(1-P_2)^2 P_1 \cdots$

$(1-P_2)(P_1) + (1-P_2)(1-P_1)(1-P_2)P_1 + (1-P_2)(1-P_1)(1-P_2)(1-P_1)(1-P_2)P_1 \cdots$

$\Rightarrow P_1[1 + (1-P_1)(1-P_2) \cdots]$

$P_1(1-P_2)[1 + (1-P_1)(1-P_2) \cdots]$

$\Rightarrow P_1\left[\frac{1}{-P_1P_2+P_1+P_2}\right] + P_1(1-P_2)\left[\frac{1}{-P_1P_2+P_1+P_2}\right]$

$\Rightarrow P_1(2-P_2)\left[\frac{1}{P_1+P_2-P_1P_2}\right] = \frac{(2-P_2)(P_1)}{-P_1P_2+P_1+P_2}$.

(2)

(6) $P_1 + P_2 = 6$ $\quad P(A') \times P(B'|B')$

(7) A = rainy $\quad$ C = late

B = traffic

$P(A) = 1/3$; $P(\frac{B}{A}) = \frac{1}{2}$; $P(\frac{B}{A'}) = 1/4$

$P(\frac{C}{A \cap B}) = \frac{1}{2}$; $P(\frac{C}{A' \cap B'}) = \frac{1}{8}$; $P(\frac{C}{A' \cap B})$ = 1/4

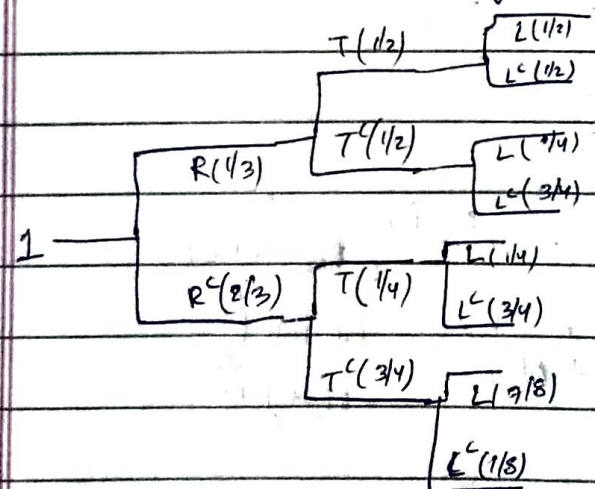
(a) $P(C|A \cap B) = 1/2$

(b) $P(C) = P(\frac{C}{A \cap B}) \times P(A \cap B) + P(\frac{C}{A' \cap B'}) \times P(A' \cap B')$

$+ \ldots + \ldots$

$\Rightarrow \frac{1}{2} \times \frac{1}{6} + \frac{1}{8} \times$

(7) Rain (R), Traffic (T), Late (L)



(a) 1/24

(b) $\frac{1}{3}\left[\left(\frac{1}{2} \times \frac{1}{2}\right) + \left(\frac{1}{2} \times \frac{1}{4}\right)\right] + \frac{2}{3}\left[\left(\frac{1}{4} \times \frac{1}{4}\right) + \left(\frac{3}{4} \times \frac{7}{8}\right)\right]$

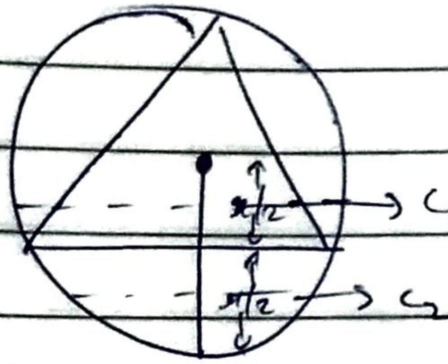
$\Rightarrow \frac{1}{3}\left[\frac{3}{8}\right] + \frac{2}{3}\left[\frac{5}{32}\right] \Rightarrow \frac{1}{8} + \frac{5}{48} = \frac{11}{48}$

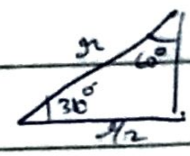
(4) $\frac{6}{11}$

B) ① $l_{equilateral} = r\sqrt{3}$

$l \in (r\sqrt{3}, 2r]$ out of $r \in (0, 2r]$

(1)



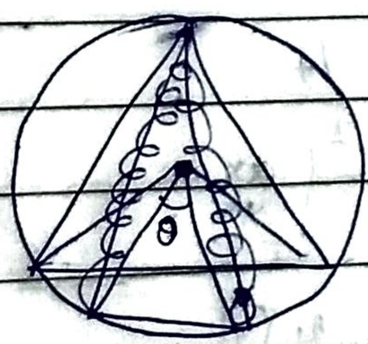


$\frac{r\sqrt{3}}{2} = \frac{l}{2}$

$l = r\sqrt{3}$

$P = 1/2$

②



Eq. Δ subtends = 120°

Chord can = [0°, 180°]

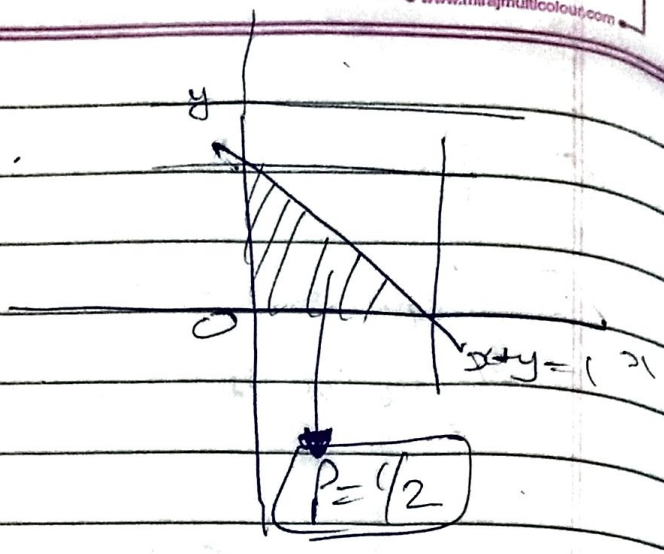
$P = 1/3$

③

(9) $a \leq 1 \quad b \leq 1$.

$a + b \leq 1$.

$ab \leq 2/9$.



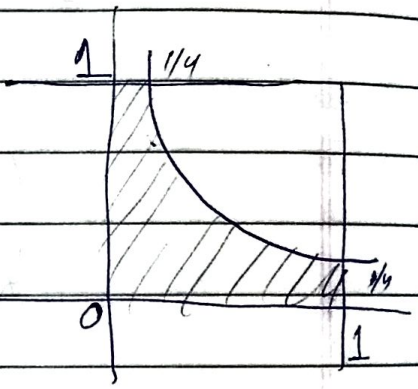
$P = 1/2$

(10) $D \geq 0 \Rightarrow 1 - 4AB \geq 0$

$AB \leq 1/4$.

$\Rightarrow$ Area favourable $= \int_{1/4}^{1} \frac{dx}{4x}$

$= \frac{1}{4} \ln(4)$.



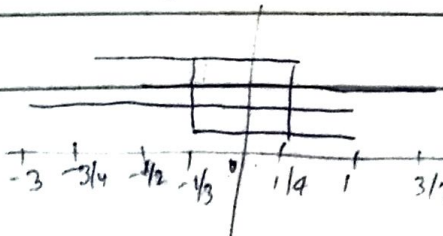
$P = \ln(4^{1/4})$.

(11) $\frac{1+3x}{4} \in [0,1]$ $\quad 1-x \in [0,4]$ $\quad 1+2x \in [0,4]$

$1+3x \in [0,4]$ $\quad -x \in [-1,3]$ $\quad x \in [-1/2, 3/2]$

$3x \in [-1,3]$ $\quad x \in [-3,1]$ $\quad 1-4x \in [0,4]$

$x \in [-1/3, 1]$ $\quad x \in [-3/4, 1/4]$



$x \in [-1/3, 1/4]$

$n^2 - n^2 + 2n - 1$

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~~(11) $x = 0$.~~

(12)

X :	n	$n-1$	$n-2$	.....	1
P :	$\frac{1}{n^2}$	$\frac{3}{n^2}$	$\frac{5}{n^2}$	.....	$2n-1$